

Test Bank for Complete Business Statistics 7th Edition Aczel
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True / False Questions

1. Objective probability involves personal judgment or intuition in a given context.
FALSE

Difficulty: Easy
Type: Concept

2. Those elements that are not in Set A are called the complement of A.
TRUE

Difficulty: Easy
Type: Concept

3. The set of all basic outcomes of an experiment is called the union of the set.
FALSE

Difficulty: Easy
Type: Concept

4. In the experiment of tossing a fair die once, the sample space includes six events.
TRUE

Difficulty: Easy
Type: Concept

5. The probability of event A is defined as the number of ways event A can occur, divided by the number of outcomes possible in the experiment.

TRUE

Difficulty: Easy

Type: Concept

6. In the experiment consisting of drawing one card at random from a standard deck of 52 cards, the sample space for the event of drawing a seven consists of 2 outcomes.

FALSE

Difficulty: Easy
Type: Concept

7. The probability of drawing a seven, from a standard deck of 52 cards is $1/4$.

FALSE

Difficulty: Easy
Type: Computation

8. If event A consists of the event of drawing a red card from a standard deck of 52 cards, then the complement of event A is the event of drawing a black card from this deck.

TRUE

Difficulty: Easy
Type: Concept

9. The intersection of two sets includes all elements that are part of either set or both sets.

FALSE

Difficulty: Easy
Type: Concept

10. The probability of event A, an event that is certain to occur is one.

TRUE

Difficulty: Easy
Type: Concept

11. The probability of drawing a card, chosen at random from a standard deck of 52 cards, which is either a diamond or a club is 0.5.

TRUE

Difficulty: Medium
Type: Computation

12. Two events which are mutually exclusive events, are also complements of each other.

FALSE

Difficulty: Medium
Type: Concept

13. When two events, A and B, are independent, then the product of their individual probabilities is equal to the probability that both events occur or $P(A) \times P(B) = P(A \cap B)$.

TRUE

Difficulty: Medium
Type: Concept

14. In order to count the number of ways that a committee of three, including a chair, a secretary and a treasurer, could be chosen from a group of ten people, a combination would be used.

FALSE

Difficulty: Medium
Type: Concept

15. The probability of any particular event or combination of events, can be larger than one in certain specific cases.

FALSE

Difficulty: Easy
Type: Concept

16. The probability of rolling a 7 on a pair of dice is higher than rolling any other number.

TRUE

Difficulty: Medium
Type: Computation

17. If the probability of rolling a 2 on a pair of dice is $1/36$, the probability of not rolling a 2 is $35/36$.

TRUE

Difficulty: Easy
Type: Computation

Multiple Choice Questions

18. One out of three mini-vans sold by a nationwide auto dealer has a hidden defect in its transmission. What is the probability that a randomly selected purchaser of two mini-vans will wind up with at least one mini-van with a defective transmission?

- A. 0.333
- B. 0.500
- C. 0.667
- D. 0.250
- E. 0.556**

Difficulty: Medium
Type: Computation

19. One out of three mini-vans sold by a nationwide auto dealer has a hidden defect in its transmission. If a small business purchases four mini-vans from this dealer, what is the probability that this purchaser will wind up with exactly two mini-vans with defective transmissions?

- A.** 0.2963
- B. 0.1111
- C. 0.2222
- D. 0.7037
- E. 0.7778

Difficulty: Medium
Type: Computation

20. An experienced business-school graduate has an 80% probability of getting a particular job. An inexperienced business-school graduate has a 50% chance of getting the same job. 60% of business-school graduates are inexperienced. If the job is offered to a business-school graduate, what is the probability that the person was inexperienced?

- A. 0.4
- B. 0.6
- C. 0.3
- D.** 0.4839
- E. 0.6667

Difficulty: Hard
Type: Computation

21. A manager assigns three different jobs to five different operators at random. Each operator is best-suited for a distinct job. What is the probability that each job will be assigned to that operator who is best for that job?

- A. $3/5$
- B.** $1/60$
- C. $3/50$
- D. $5/60$
- E. $1/15$

Difficulty: Hard
Type: Computation

Use the following to answer questions 22-23:

The probability that a customer will buy a product given that he or she has seen an advertisement for the product is 0.15. The probability that a consumer will see an ad for this particular product is 0.20.

22. What is the probability that a consumer will both see the ad and buy the product?

- A. 0.75
- B. 0.075
- C. 0.35
- D. 0.03**
- E. 0.035

Difficulty: Medium
Type: Computation

23. The probability that a consumer who did not see this ad will buy the product is 0.05. Find the probability that a given consumer will buy the product.

- A. 0.04
- B. 0.07**
- C. 0.03
- D. 0.012
- E. None of the above

Difficulty: Medium
Type: Computation

24. The probability that account A will have an error in it is 0.75. The probability that account B will have an error in it is 0.40. The probability that both accounts will be in error is 0.20. Are these two accounts independent of each other?

- A. Yes
- B. No**
- C. Insufficient information to determine

Difficulty: Medium
Type: Computation

25. The probability that a shot will hit the target is 0.02. Successive shots are independent of each other. What is the probability that at least one out of four shots will hit the target?

- A. 0.25
- B. 0.005
- C. 0.99999984
- D. 0.00000016
- E. 0.0776**

Difficulty: Medium
Type: Computation

26. A car gets involved in an accident 80% of the time if it is defective. If it is not defective, the probability reduces to 40%. 30% of all cars are defective. If a car is involved in an accident, what is the probability that it was defective?

- A. 0.32
- B. 0.24
- C. 0.4615**
- D. 0.12
- E. 0.0343

Difficulty: Hard
Type: Computation

27. Thirty percent of the managers in a certain company have MBA degrees as well as professional training. Eighty percent of all managers in the firm have professional training. If a manager is randomly chosen and found to have professional training, what is the probability that he or she also has an MBA?

- A. 0.24
- B. 0.5
- C. 0.375**
- D. 0.26
- E. 0.625

Difficulty: Medium
Type: Computation

28. A box has 20 screws, three of which are known to be defective. What is the probability that the first two screws taken out of the box are both defective?

- A.** 0.0158
- B. 0.15
- C. 0.0237
- D. 0.0225
- E. None of the above

Difficulty: Medium
Type: Computation

29. A box has 20 screws, three of which are known to be defective. What is the probability that exactly one of the first two screws taken out of the box are defective?

- A. 0.1342
- B.** 0.2684
- C. 0.05
- D. 0.0158
- E. None of the above

Difficulty: Medium
Type: Computation

Use the following to answer questions 30-31:

Two players are competing in a shooting gallery, each getting one shot at the target. The probability of the first shooter hitting the target is 0.57 and the probability of the second shooter hitting the target is 0.65.

30. What is the probability that both shooters hit their targets?

- A. 0.08
- B. 0.8769
- C.** 0.3705
- D. 0.614
- E. 0.6615

Difficulty: Medium
Type: Computation

31. What is the probability that at least one of the two players hits the target?

- A. 0.3705
- B. 0.8769
- C. 0.2795
- D.** 0.8495
- E. 1.22

Difficulty: Medium
Type: Computation

32. A company has two production lines for plastic bottles, A and B. Two percent of the bottles coming off of line A are defective and 8% of those off of line B are defective. Line A produces three times as many bottles as Line B. If a bottle is selected at random and found to be defective, what is the probability that it came from line A?

- A. 0.04
- B. 0.4
- C. 0.1111
- D.** 0.4286
- E. 0.625

Difficulty: Hard
Type: Computation

33. A particular company has twenty salespeople. How many ways can a group of three salespeople be chosen from this company?

- A.** 1140
- B. Permutation of 20 chose 3
- C. Combination of 20 chose 20
- D. 5700
- E. None of the above

Difficulty: Medium
Type: Computation

Use the following to answer questions 34-35:
An urn contains two red balls and three white balls.

34. If a ball is chosen at random, what is the probability that it is white?

- A. 0
- B. 1
- C. $2/5$
- D. $1/5$
- E. $3/5$**

Difficulty: Easy
Type: Computation

35. Suppose two balls are drawn randomly. What is the probability that both will be white?

- A. $1/10$
- B. $3/20$
- C. $6/20$**
- D. $9/20$
- E. $9/25$

Difficulty: Medium
Type: Computation

36. The probability that a contractor will win a bid for contract A is 0.45; the probability that the contractor will win a bid for contract B is 0.25. The two bids are believed to be independent of each other. What is the probability that the contractor will win at least one of the two bids?

- A. 0.70
- B. 0.20
- C. 0.1125
- D. 0.5875**
- E. 0.5556

Difficulty: Medium
Type: Computation

37. The probability of stock A rising is 0.3 and of stock B rising is 0.4. What is the probability that neither of the stocks rise, assuming that these two stocks are independent?

- A.** 0.42
- B. 0.12
- C. 0.88
- D. 0.44
- E. 0.70

Difficulty: Medium
Type: Computation

38. The probability of stock A rising is 0.3 and of stock B is 0.4. If stocks A and B are not independent and the probability of both stocks rising is 0.09, what is the probability that neither stock rises?

- A. 0.61
- B.** 0.39
- C. 0.12
- D. 0.91
- E. 0.03

Difficulty: Medium
Type: Computation

39. A bag has five pearls in it, out of which one is artificial. If three pearls are taken out at random, what is the probability that the artificial pearl is one of them?

- A. $\frac{1}{5}$
- B. $\frac{2}{5}$
- C.** $\frac{3}{5}$
- D. $\frac{4}{5}$
- E. None of the above

Difficulty: Easy
Type: Computation

40. What is the probability of getting at least one six in five rolls of a single fair die?

- A. $1/5$
- B. $1/30$
- C. $1/6$
- D. $5/6$
- E.** 0.5981

Difficulty: Medium
Type: Computation

41. If the probability of event A is 0.5 and the probability of event B is 0.25 and nothing else is known about A and B, then the probability that either A or B or both will occur, is?

- A. 0.75
- B. 0.125
- C. 0
- D. 0.25
- E.** Insufficient information to determine

Difficulty: Easy
Type: Concept

42. The probability that a missile will hit the target in a given launching is 0.2. Launches are known to be independent of each other. The probability that at least one missile will hit the target in 3 independent launches is:

- A.** 0.488
- B. 0.505
- C. 0.6
- D. 0.8
- E. 0

Difficulty: Medium
Type: Computation

43. The probability that both events A and B will occur is 0.15. The probability that event A will occur is 0.3. Then the probability that A will occur, given that B has occurred is:

- A. 0
- B. 0.5
- C. Insufficient information to determine**
- D. 0.05
- E. 0.15

Difficulty: Medium
Type: Concept

44. Suppose that two events A and B are mutually exclusive. We know that the probability of A is 0.4 and the probability of B is 0.2. The probability that either A or B (or both) will occur is:

- A. 0.08
- B. 0.52
- C. 0.60**
- D. 0
- E. None of the above

Difficulty: Easy
Type: Computation

45. Suppose that the probability of A is 0.7 and the probability of B is 0.4 and we know that the probability that both A and B will occur is 0.28. Then the two events are

- A. Unrelated to each other
- B. Mutually exclusive
- C. Independent**
- D. Dependent
- E. Unable to occur at the same time

Difficulty: Medium
Type: Computation

46. If the probability of A is 0.45 and the probability of the intersection of A and B is 0.15, then the probability that B will occur given that A has occurred is:

- A. 3.00
- B. 1.00
- C. $\frac{1}{3}$**
- D. $\frac{1}{9}$
- E. 0.675

Difficulty: Medium
Type: Computation

47. The probability that event A will occur is 0.6. Given that event A occurs, the probability that event B will occur is 0. The probability that both events A and B will occur is:

- A. 1
- B. 0**
- C. Insufficient information to determine
- D. 0.6
- E. 0.4

Difficulty: Easy
Type: Concept

48. The probability of event A is 0.7 and the probability of event B is 0.7. Then the probability of the intersection of A and B is?

- A. 0.49
- B. 0
- C. 1
- D. 1.4
- E. Insufficient information to determine**

Difficulty: Easy
Type: Concept

49. The probability of event A is 0.99, the probability of event B is 0.01 and the probability of event C is 0.01. The three events are independent of each other. The probability that at least one of the three events will occur is:

- A. 1.01
- B. 1
- C. 0.99**
- D. 0.099
- E. 0.01

Difficulty: Medium
Type: Computation

50. The probability that a rocket will hit a target is 0.8. Five different rockets of this type are fired. Assuming that the rockets are fired independently, the probability that all rockets will hit their target is:

- A. 0.3277**
- B. 0.9996
- C. 0.0004
- D. 0.6723
- E. None of the above

Difficulty: Medium
Type: Computation

51. If the $P(A) = 0.3$; $P(B) = 0.5$ and A and B are mutually exclusive, then the probability of A or B or both occurring is:

- A. $P(A) + P(B)$**
- B. $P(A) \times P(B)$
- C. $P(A) + P(B) - P(A) \times P(B)$
- D. Zero
- E. Cannot be determined

Difficulty: Medium
Type: Concept

52. If $P(A) = 0.2$; $P(B) = 0.6$ and A and B are independent events, then the $P(A \cup B)$ is:

- A. $P(A) + P(B)$
- B. $P(A) \times P(B)$
- C. $P(A) + P(B) - P(A) \times P(B)$**
- D. Zero
- E. Cannot be determined

Difficulty: Medium

Type: Concept

53. If the probability of A is 0.5 and the probability of B is 0.2 and the probability of the union of A and B is 0.7, then:

- A. A and B are independent
- B. A and B are mutually exclusive**
- C. A and B are dependent
- D. A and B do have an intersection
- E. Impossible to determine

Difficulty: Medium

Type: Concept

54. If the probability of A is 0.33 and the probability of B is 0.33 and the probability of either A and B both occurring is 0.66, then:

- A. A and B are dependent
- B. A and B are independent
- C. A and B are mutually exclusive**
- D. If A occurs, B is certain to occur
- E. There is not enough information to make a conclusion

Difficulty: Medium

Type: Concept

55. If the probability of A is 0.6 and the probability of A given B is 0.2, then the probability of the intersection of A and B is:

- A. 0.12
- B. 0.3333
- C. 0.80
- D. 0.68
- E.** Insufficient information to determine

Difficulty: Medium
Type: Concept

56. I shoot at a target five times and each time my probability of hitting is 0.40. Assuming that each shot is independent, my probability of hitting the target at least once is:

- A. 0.01024
- B. 0.07776
- C.** 0.92224
- D. A number very close to zero
- E. None of the above

Difficulty: Medium
Type: Computation

57. The probability that I get job A is 0.45; the probability that I get job B is 0.60 and the probability that I get both the jobs is 0.30. The probability that I get at least one job offer is:

- A. 0.30
- B. 0
- C. 1
- D. 0.55
- E.** 0.75

Difficulty: Medium
Type: Computation

58. The probability that event A will occur is 0.90 and the probability that event B will occur is 0.10. The two events are known to be mutually exclusive. The probability that both A and B will occur is:

- A. 0
- B. 1
- C. 0.5
- D. 0.33
- E. Insufficient information to determine

Difficulty: Easy
Type: Concept

59. The probability that account A is in error is 0.05 and the probability that account B is in error is 0.05. Nothing else is known about the nature of the accounts or any relationship between them. The probability that at least one of the two accounts is in error is:

- A. 0.05
- B. 0.10
- C. 0.0975
- D. 0
- E. Insufficient information to determine

Difficulty: Medium
Type: Concept

60. The probability that event A will occur is 0.7 and the probability that event B will occur is 0.7 and the probability that both events will occur is 0.49. The two events are:

- A. Independent
- B. Mutually exclusive
- C. Dependent
- D. Disjoint
- E. Insufficient information to determine

Difficulty: Medium
Type: Concept

61. The probability of a successful merger with a larger firm is 0.40. Given that a merger is successful, there is a 0.25 probability that profits next year will be high. What is the probability that both the merger will succeed and that profits next year will be high?

- A. 0.10**
- B. 1
- C. 0.15
- D. 0.625
- E. 1.6

Difficulty: Medium
Type: Computation

Use the following to answer questions 62-66:

The following table shows the outcome of 500 interviews attempted during an opinion survey of randomly selected individuals in four counties:

County	Interview Outcome		
	Completed (C)	Not at Home (N)	Refused (R)
Applewood	100	20	5
Bakingwell	115	5	5
Crustboro	50	60	15
Doughton	35	50	40

62. What is the probability that a randomly selected interview report was actually completed?

- A. 0.20
- B. 0.25
- C. 0.60**
- D. 0.75
- E. 0.80

Difficulty: Easy
Type: Computation

63. What is the probability that a randomly selected interview report came from Applewood County?

- A. 0.20
- B. 0.25**
- C. 0.60
- D. 0.75
- E. 0.80

Difficulty: Easy
Type: Computation

64. What is the probability that a randomly selected interview report involved *both* a Doughton County respondent *and* a refusal to be interviewed?

- A. 0.38
- B. 0.30
- C. 0.25
- D. 0.08**
- E. 0.02

Difficulty: Medium
Type: Computation

65. What is the probability that a randomly selected interview report involved *either* a Bakingwell County respondent *or* a completed interview?

- A. 0.62**
- B. 0.65
- C. 0.68
- D. 0.83
- E. 0.85

Difficulty: Hard
Type: Computation

66. Suppose a randomly selected interview report is from Crustboro County. What is the probability the person targeted wasn't at home?

- A. 0.27
- B. 0.48**
- C. 0.65
- D. 0.72
- E. 0.84

Difficulty: Medium
Type: Computation

Use the following to answer questions 67-68:

A construction company employs three engineers—Alfred, Becky and Chris—whose responsibility it is to estimate costs for input into bids for prospective jobs. While each engineer is very good at his or her work, each also occasionally makes a serious error in cost estimation. Their past performance with respect to productivity and accuracy has been summarized in the following table:

Engineer	Cost Estimates Produced (%)	Seriously Inaccurate (%)
Alfred	40.0	5.0
Becky	35.0	4.0
Chris	25.0	3.0

67. Suppose a recently developed cost estimate has been shown to be seriously inaccurate. What is the probability that this estimate was prepared by Chris?

- A. 0.250
- B. 0.482**
- C. 0.518
- D. 0.815
- E. 0.842

Difficulty: Medium
Type: Computation

68. Suppose a recently developed cost estimate has been shown to be seriously inaccurate. What is the probability that this estimate was prepared by either Alfred or Becky?

- A. 0.022
- B. 0.090
- C. 0.518**
- D. 0.750
- E. 0.815

Difficulty: Hard
Type: Computation

69. Five of the 12 members of the board of directors of Giganticus, Inc., will be placed on a subcommittee that will decide if John Goodhair, Chairman and CEO, will remain in his position. How many subcommittees are possible if members are randomly chosen?

- A. 792**
- B. 879
- C. 972
- D. 95040
- E. None of the above

Difficulty: Medium
Type: Computation

70. Members of a special marketing project team have decided to break the work up into smaller portions and divide it among sub-groups. There are 9 team members. How many different sub-groups are possible if each sub-group consists of 4 members and order doesn't matter?

- A. 362880
- B. 3024
- C. 126**
- D. 42
- E. 24

Difficulty: Medium
Type: Computation

71. Members of a special marketing project team have decided to break the work up into smaller portions and divide it among sub-groups. There are 7 team members. How many different sub-groups are possible if each sub-group: a) consists of 3 members and b) has a sub-group chairperson and vice-chairperson?

- A. 5040
- B. 210**
- C. 187
- D. 35
- E. 6

Difficulty: Hard
Type: Computation

72. MBA students at a private business school can, if they wish to do so, choose a concentration in one of three areas: real estate development, financial planning or marketing/promotions. For those students who don't wish to concentrate in a particular area, the school offers a generalist track. If an experiment consisted of randomly sampling a student in the MBA program, the sample space for the experiment would be described as _____.

- A. Pursuing a concentration and $\bar{A}$: not pursuing a concentration**
- B. Pursuing one concentration and $\bar{A}$: pursuing more than one concentration
- C. Concentrating in real estate development and $\bar{A}$: concentrating in either financial planning or marketing/promotions
- D. Concentration in real estate development and $\bar{A}$: concentration in another area
- E. Pursuing an MBA and $\bar{A}$: not pursuing an MBA

Difficulty: Easy
Type: Concept

73. A mortgage lender that buys mortgages from both prime and sub-prime originators is studying the payment histories of the mortgages it has held recently. A random sample of 1,000 mortgage histories is summarized as follows:

Originator	Five-Year Payment History		
	None	At Least 2 Late	Default
Prime	526	132	21
Sub-Prime	208	79	34

A mortgage is to be randomly selected from this sample. What is the probability that it has shown no late payments over its five-year history?

- A. 0.526
- B. 0.208
- C. 0.266
- D. 0.734**
- E. 0.812

Difficulty: Medium
Type: Computation

74. A mortgage lender that buys mortgages from both prime and sub-prime originators is studying the payment histories of the mortgages it has held recently. A random sample of 1,000 mortgage histories is summarized as follows:

<u>Originator</u>	<u>Five-Year Payment History</u>		
	<u>None</u>	<u>At Least 2 Late</u>	<u>Default</u>
Prime	526	132	21
Sub-Prime	208	79	34

A mortgage is to be randomly selected from this sample. What is the probability that it will be either: a) originated by a sub-prime originator or b) has been in default over its five-year history?

- A. 0.055
- B. 0.034
- C. 0.342**
- D. 0.376
- E. 0.381

Difficulty: Medium
Type: Computation

75. A mortgage lender that buys mortgages from both prime and sub-prime originators is studying the payment histories of the mortgages it has held recently. A random sample of 1,000 mortgage histories is summarized as follows:

Originator	Five-Year Payment History		
	None	At Least 2 Late	Default
Prime	526	132	21
Sub-Prime	208	79	34

A mortgage is to be randomly selected from this sample. If the mortgage was originated by a prime originator, what is the probability that it has had no late payments over its five-year history?

- A. Not more than 0.45
- B. More than 0.45 but not more than 0.55
- C. More than 0.55 but not more than 0.65
- D. More than 0.65 but not more than 0.75
- E. More than 0.75**

Difficulty: Medium
Type: Computation

76. Researchers have found that, for professional basketball players, the probability of making any given free throw is virtually constant over time. This means that when a basketball player is awarded two free throws, his/her likelihood of making the second free throw remains the same regardless of what happened on his/her first try. That is, $P(\text{make second} | \text{made first}) = P(\text{make second} | \text{missed first})$. This is an example of events being:

- A. Statistically independent**
- B. Sequentially intercorrelated
- C. Serially interconnected
- D. Temporally isolated
- E. Trivially heteroscedastic

Difficulty: Easy
Type: Concept

77. Craps is a popular casino game in which players bet on rolls of two fair, six-sided dice. A popular bet is the so-called "Field Bet", a single-roll bet in which the player wins if a 2, 3, 4, 9, 10, 11 or 12 is thrown. There are 36 possible combinations of two fair, six-sided dice and there are 16 possible dice combinations that result in a win on the "Field Bet". What is the probability of winning on any single "Field Bet"?

- A. Not more than 0.3
- B. More than 0.3 but not more than 0.4
- C. More than 0.4 but not more than 0.5
- D. More than 0.5 but not more than 0.6
- E. More than 0.6

Difficulty: Medium
Type: Computation

78. Craps is a popular casino game in which players bet on rolls of two fair, six-sided dice. A popular bet is the so-called "Field Bet", a single-roll bet in which the player wins if a 2, 3, 4, 9, 10, 11 or 12 is thrown. There are 36 possible combinations of two fair, six-sided dice and there are 16 possible dice combinations that result in a win on the "Field Bet". Assuming that the outcome of any roll of the dice is independent of previous rolls, what is the probability of winning three times consecutively on the "Field Bet"?

- A. Not more than 0.1
- B. More than 0.1 but not more than 0.2
- C. More than 0.2 but not more than 0.3
- D. More than 0.3 but not more than 0.4
- E. More than 0.4

Difficulty: Easy
Type: Computation

79. Ree-Lax Inns, a national hotel chain, buys mattresses from only two firms. Because Supplier A's defect rate (3%) is twice that of Supplier B, Ree-Lax buys three-fourths of its mattresses from Supplier B. Suppose a mattress has been found to be defective. What is the probability it was produced by Supplier B?

- A. 0.01125
- B. 0.3
- C. 0.6**
- D. 0.75
- E. 0.81

Difficulty: Hard
Type: Computation

Short Answer Questions

80. The probability that traffic will be banned around the town square if a certain legislation is passed is 0.85. The probability that traffic will be banned if the legislation in question does not pass is 0.20. If the probability that the legislation will pass is 0.40, what is the probability that traffic will be banned?

$$(.85) \times (.40) + (.20) \times (.60) = 0.34 + 0.12 = 0.46$$

Difficulty: Medium
Type: Computation

81. My probability of getting job A is 0.20; my probability of getting job B is 0.10; my probability of getting job C is 0.35 and my probability of getting job D is 0.05. All jobs are independent of each other. What is my probability of getting at least one of these jobs?

$$1 - P(\text{not getting any of the 4 jobs}) = 1 - [(.8) \times (.9) \times (.65) \times (.95)] = 1 - 0.446 = 0.554$$

Difficulty: Medium
Type: Computation

82. Two or more events which cannot occur at the same time are called

_____.

mutually exclusive

Difficulty: Easy

Type: Concept

83. When two events are disjointed, the probability that they both occur is

_____.

zero

Difficulty: Medium

Type: Concept

84. If the $P(A) = 0.20$ and $P(B) = 0.30$ and the two events are mutually exclusive, what is the $P(A \cap B)$?

zero

Difficulty: Easy

Type: Concept

85. If the $P(A) = 0.20$ and $P(B) = 0.30$ and A and B are known to be independent, what is the probability of the intersection of A and B?

$0.20 \times 0.30 = 0.06$, if A and B are independent

Difficulty: Medium

Type: Computation

86. Ten people try out for a local basketball team. If only five people can be chosen for the team and all players can play all positions, how many ways can this team be chosen?

combination of 10 choose 5 = 252

Difficulty: Medium
Type: Computation

87. Suppose 100 people enter a drawing for three grand prizes of \$10,000, \$5,000 and \$1,000. How many ways can the winners for these three prizes be selected?

permutation of 100 choose 3 = $100 \times 99 \times 98 = 970,200$

Difficulty: Medium
Type: Computation

88. If the probability of event A is 0.82, what is the probability of the complement of event A?

$1 - 0.82 = 0.18$

Difficulty: Easy
Type: Computation

Use the following to answer questions 89-92:

On the assembly line, a bin of nuts has three times as many nuts as bolts. (Assume an unlimited supply.)

89. What is the probability that, without looking, a worker will pull out a nut on the first grab?

$\frac{1}{4}$

Difficulty: Medium
Type: Computation

90. What is the probability that the second grab will produce a nut?

$\frac{1}{4}$

Difficulty: Medium
Type: Computation

91. What is the probability that the second grab will produce a nut if the first grab produced a bolt?

$\frac{1}{4}$

Difficulty: Medium
Type: Computation

92. What is the probability that two grabs will produce one nut and one bolt?

$\frac{3}{8}$

Difficulty: Medium
Type: Computation

Use the following to answer questions 93-94:

On the assembly line, a bin of nuts has three times as many nuts as bolts. (Assume an unlimited supply.)

93. Suppose that later in the day, on the same assembly line, the bin has been emptied down to eight nuts and two bolts. What is the probability that, without looking, a worker will pull out a nut on the first grab?

8/10

Difficulty: Medium
Type: Computation

94. Suppose that later in the day, on the same assembly line, the bin has been emptied down to eight nuts and two bolts. What is the probability that two grabs will produce a nut and a bolt?

16/45

Difficulty: Medium
Type: Computation

95. A shipment of 144 widgets is to be rejected if one or more out of five selected at random are found to be defective. If a particular shipment has three defective items, what is the probability that the shipment will be rejected?

0.1013

Difficulty: Hard
Type: Computation

Use the following to answer questions 96-97:

A certain weather forecaster is correct 80% of the time when he forecasts rain and 90% of the time when he forecasts sun. Given the climate in his area, 30% of his forecasts are for rain and 70% are for sun.

96. Suppose it rained yesterday. What is the probability that yesterday's forecast actually called for rain?

0.7742

Difficulty: Hard
Type: Computation

97. What is the overall probability of a correct forecast?

0.87

Difficulty: Hard
Type: Computation

Use the following to answer questions 98-99:

A large urn contains n red balls, $2n$ green balls and $3n$ blue balls. Three balls are drawn at random, one after another.

98. What is the probability of the sequence: RGB?

$1/36$

Difficulty: Medium
Type: Computation

99. What is the probability that all three balls will be the same color?

$$1/6$$

Difficulty: Medium
Type: Computation

Use the following to answer questions 100-101:

A small urn contains 4 red balls, 8 green balls and 12 blue balls. Three balls are drawn at random, one after another, without replacement.

100. What is the probability of the sequence: RGB?

$$8/253 = 0.03162$$

Difficulty: Medium
Type: Computation

101. What is the probability that all three balls will be the same color?

$$35/253 = 0.1383$$

Difficulty: Medium
Type: Computation

102. You are playing dice and have a sudden urge to bet on a hard six, a role of three on each die. What is the probability that you will roll a hard six on the next roll of the pair of dice?

$$1/36 = .0278$$

Difficulty: Easy
Type: Computation

103. You are playing dice and have an urge to bet on either six or an eight being rolled. What is the probability that you will win your bet on the next roll of the pair of dice?

$$5/36 + 5/36 = .2778$$

Difficulty: Medium
Type: Computation

Use the following to answer questions 104-105:

WAN Services has a 1,000 customer service representatives, 30% of whom have undergone extensive training in the S.M.I.L.E. Method. Since the training began, WAN management has kept track of those representatives who have had at least one customer complaint and has observed that the complaint total attributed to non-trained representatives is more than twice that (455 vs. 195) of trained representatives.

104. If a randomly selected customer-service representative has undergone S.M.I.L.E. Training, what is the probability that he or she will have generated at least one customer complaint?

$$195/300 = 0.65$$

Difficulty: Easy
Type: Computation

105. Management has come to the conclusion that the S.M.I.L.E. Method is a valuable tool for improving customer service. Do you agree and why or why not?

No, since those who have undergone the S.M.I.L.E. Training have the same probability of generating a complaint ($195/300 = 0.65$) as those who have not undergone the training ($455/700 = 0.65$).

Difficulty: Medium
Type: Computation

106. Auditors have observed that a particular accounting error tends to be associated with attempts to misstate financial positions. Approximately 85% of firms attempting to misstate their earnings will commit this accounting error; for a firm *not* trying to misstate its earnings, the likelihood of making this error is approximately 5%. It has been estimated that the percentage of firms attempting to misstate earnings at any given time is only 5%. Suppose that in an audit of QRS Airlines, an auditor discovers this particular accounting error. What is the probability that this is *not* an honest mistake (i.e., QRS has actually been attempting to misstate its earnings)?

$$(.85 * .05) / [(.85 * .05) + (.05 * .95)] = 0.4722$$

Difficulty: Hard
Type: Computation

107. An airline is considering making changes to its frequent flier program. As a start, it randomly samples 2,000 passengers from the past six months. The data indicate that there are three broad classes of passengers: A) those who accumulate frequent flier miles *only* by flying; B) those who accumulate frequent flier miles by both flying and participating in partner (e.g., credit card) programs and C), those who do not participate in the airline's frequent flier program. The data are summarized in the following table:

Earner Type	Gender	
	Male	Female
Flying Only	564	376
Flying + Partner	612	408
Don't Participate	24	16

A random passenger is to be selected from this sample. What is the probability that this passenger:

- a) is a man?
- b) doesn't participate in the frequent flier program?
- c) is either a woman or a passenger who accumulates miles both through flying and through a partner's program?
- d) is both a man and a non-participant in the frequent flier program?

- a) 0.6
- b) 0.02
- c) 0.706
- d) 0.012

Difficulty: Hard
Type: Computation

108. In a market test of a restaurant chain's new "Smart-Size" portions, 800 of 1,200 younger (30 years old) customers rated the new products favorably. Of the 450 older (> 30 years old) customers, only 300 rated the new products favorably. What is:

- a) the probability a customer will rate the products favorably given she/he is over 30 years old?
- b) the probability a customer who rates the products unfavorably will be a younger (30 years old) customer?
- c) To market the new "Smart-Size" portions, management is considering developing separate marketing strategies for older and younger customers. Do these results indicate that separate marketing strategies are necessary?

- a) 0.667
- b) 0.727
- c) These data indicate that age (younger vs. older) and satisfaction with the "Smart-Size" portions are statistically independent – $P(\text{favorable} \mid \text{older}) = 0.667$ and $P(\text{favorable} \mid \text{younger}) = 0.667$. Perhaps separate campaigns are not necessary.

Difficulty: Hard
Type: Computation

109. Suppose research has indicated that only 1% of credit card transactions are fraudulent. Further suppose that 0.03% of fraudulent credit card transactions are associated with internet casinos, but that only 0.0007% of non-fraudulent credit card transactions are associated with internet casinos. If a given credit card transaction involves an internet casino, what is the probability it is fraudulent?

$$0.302115 = (0.0003 \cdot 0.01) / [(0.0003 \cdot 0.01) + (0.000007 \cdot 0.99)]$$

Difficulty: Hard
Type: Computation